

What I claim is:

1. A roller insert for a conveyor roller tube, comprising:
 - (a) a cartridge having inner and outer ends and configured to be inserted into an end of a conveyor roller tube;
 - (b) a stub axle positioned within said cartridge, said stub axle including an elongate body portion, a cylindrical tip portion extending away from said body portion, and an end cap having distal and proximal ends and a hardness less than that of said tip portion, said end cap threadingly secured on said cylindrical tip portion; and
 - (c) at least one bearing mounted within said cartridge and supporting said axle such that said cartridge is rotatable with respect to said axle and said axle is slidable with respect to said bearing;wherein said axle is biased outwardly from said cartridge such that said end cap projects outwardly from said cartridge outer end.
2. The roller insert of claim 1, wherein said axle further includes an annular shoulder located between said body portion and said tip portion, and said end cap is threadingly secured to said tip portion such that the proximal end of the end cap engages said shoulder.
3. The roller insert of claim 2, wherein said end cap is hollow and is configured to receive said tip portion in the interior of the end cap.
4. The roller insert of claim 3, wherein said cylindrical tip portion of the axle has an outer end surface and a threaded bore extending from said outer end surface towards said body portion, and further wherein the interior of the end cap includes a threaded shaft extending from the distal end of the end cap such that said end cap is secured on said tip portion by threading engagement of said threaded shaft and said threaded bore.

5. The roller insert of claim 4, wherein said end cap comprises a polymeric material.
6. The roller insert of claim 4, wherein the cross-sectional shape of said end cap is hexagonal.
7. The roller insert of claim 4, wherein said end cap is tapered along at least a portion of its length.
8. The roller insert of claim 1, comprising a pair of bearings mounted within said cartridge and supporting said axle such that said cartridge is rotatable with respect to said axle and said axle is slidable with respect to said bearings.
9. The roller insert of claim 2, further comprising a bushing mounted within said bearing, said bushing having a central bore which, wherein said elongate body portion of the axle is slidably positioned within said central bore of said bushing.
10. The roller insert of claim 9, wherein said bushing further includes an outer circumference, and a groove extending about said outer circumference, wherein the inner race of said at least one bearing is positioned at least partially within said groove.
11. The roller insert of claim 10, wherein said bushing includes a plurality of flexible fingers at its proximal end, each of said fingers having a proximal end surface, and further wherein said axle includes a flange positioned such that said flange is biased against the proximal end surfaces of said fingers, whereby said fingers are urged outwardly so as to retain said bushing in place.
12. The roller insert of claim 11, further comprising a coil spring for biasing said axle, and wherein said axle further includes a rod portion extending away from the proximal end of said elongate body portion, with said flange located between said elongate body portion and said rod portion and said coil spring extending about said rod portion and seated against said flange.

13. The roller insert of claim 11, further comprising a second bearing mounted within said cartridge, said second bearing slidably supporting said rod portion of the axle, wherein one end of said coil spring is seated against said flange and the other end of said coil spring is seated against said second bearing.

14. The roller insert of claim 13, wherein said end cap comprises an electrically conductive polymeric material, the cross-sectional shape of said end cap is hexagonal, the cross-sectional shape of said elongate body member of the axle is hexagonal, the diameter of the proximal end of said end cap corresponds to the diameter of said elongate body portion, and said end cap is threadingly secured to said tip portion such that the hexagonal shape of the end cap is aligned with the hexagonal shape of said elongate body portion.

15. A conveyor roller, comprising an elongate roller tube and a roller insert inserted into each end of said roller tube, each of said roller inserts comprising:

(a) a cartridge having inner and outer ends and configured to be inserted into an end of a conveyor roller tube;

(b) a stub axle positioned within said cartridge, said stub axle including an elongate body portion, a cylindrical tip portion extending away from said body portion, and an end cap having distal and proximal ends and a hardness less than that of said tip portion, said end cap threadingly secured on said cylindrical tip portion; and

(c) at least one bearing mounted within said cartridge and supporting said axle such that said cartridge is rotatable with respect to said axle and said axle is slidable with respect to said bearing;

wherein each of said axles is biased outwardly from its corresponding cartridge such that said end cap projects outwardly from said cartridge outer end.

16. The conveyor roller of claim 15, wherein each of said axles further includes an annular shoulder located between said body portion and said tip portion, and said end cap is

threadingly secured to said tip portion such that the proximal end of the end cap engages said shoulder.

17. The conveyor roller of claim 16, wherein each of said end caps is hollow and is configured to receive said tip portion in the interior of the end cap.

18. The conveyor roller of claim 17, wherein each of said end caps comprises a polymeric material, and the cross-sectional shape of said end caps is hexagonal.

19. An axle for use in a conveyor roller, said axle comprising:

- (a) an elongate body portion;
- (b) at least one cylindrical tip portion extending away from said body portion;
- (c) an annular shoulder located between said body portion and said tip portion;
- (d) a hollow end cap having distal and proximal ends and a hardness less than that of said tip portion, said end cap threadingly secured on said cylindrical tip portion such that the proximal end of the end cap engages said shoulder.

19. The axle of claim 18, wherein said at least one cylindrical tip portion has an outer end surface and a threaded bore extending from said outer end surface towards said body portion, and further wherein the interior of said end cap includes a threaded shaft extending from the distal end of the end cap such that said end cap is secured to said tip portion by threading engagement of said threaded shaft and said threaded bore.

20. The axle of claim 18, wherein said axle comprises a stub axle.

21. The axle of claim 19, wherein said end cap comprises a polymeric material.

22. The axle of claim 19, wherein said end cap comprises an elastomer.

23. The axle of claim 19, wherein the cross-sectional shape of said end cap is hexagonal.

24. The axle of claim 19, wherein said end cap is tapered along at least a portion of its length.